REMARKS

Upon entry of the present amendment, Amendment A, claims 1-6 and 9-12 are pending in the application, of which claims 1 and 2 are independent. Claims 7 and 8 are canceled, and claims 1, 2, 4, 9 and 10 are amended herein. The amendments to the claims are fully supported in the specification as discussed below, and no new matter is added.

The above-identified Office Action has been reviewed, the references carefully considered, and the Examiner's comments carefully weighed. In view thereof, the present Amendment is submitted. It is contended that by the present Amendment, all bases of rejection set forth in the Office Action have been traversed and overcome. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

Telephone Interview

Initially, applicant would like to thank the Examiner for his very helpful remarks during the telephonic interviews he conducted with the applicant's representative on August 3, 7 and 8, 2006. In the initial discussion, arguments were presented that the Goernig reference (US 2002/0166472 A1) does not disclose the communication/ignition circuit (6) and the ignition element (10) on a silicon chip, as claimed, since the structure 2 of Goernig is disclosed as a circuit board rather than a chip.

In this regard, the Examiner noted that the applicant's disclosure and claimed recitation of the silicon chip 27 provides no structure which differentiates it from the circuit board 2. That is, the Examiner notes that chip 27 (or 27a, b) is a support structure which supports the communication/ignition circuit (28) and the ignition element (29) thereon, and appears to provide a

function similar to that of a circuit board since electrical leads 31, 31 are printed on the chip 27. As such, the Examiner considers the claimed chip to correspond to the board 2 disclosed by Goernig. Further, the Examiner considers the disclosure of Goernig to particularly apply to Figs. 2 and 3 of the applicant's disclosure.

The following proposed amendments were presented to the Examiner for consideration:

Claim 1 (currently amended). An ignition device for bus connection, of a type in which a plurality of the ignition devices are connected to an ignition control system via a common bus, and the ignition devices are selectively operable by means of electrical energy and an electrical signal supplied from the ignition control system,

wherein the ignition device comprises:

an ignition package integrally comprising a communication/ignition circuit provided on a first silicon chip and an ignition element provided on ~~another~~ a second silicon chip, wherein

the first and second silicon chips are each embedded in a single synthetic resin body such that the first silicon chip is supported independently of the second silicon chip.

Claim 2 (currently amended). An ignition device for bus connection, of a type in which a plurality of the ignition devices are connected to an ignition control system via a common bus, and the ignition devices are selectively operable by means of electrical energy and an electrical signal supplied from the ignition control system,

wherein the ignition device comprises:

an ignition package integrally comprising a communication/ignition circuit provided on a silicon chip and an ignition element also provided on the silicon chip,

a casing which houses the ignition package therein, the casing having a single open end, and

a header disposed in the casing, the header configured to close the open end of the casing, the header supporting the ignition package within the casing.

With respect to claim 1, the Examiner referred to the disclosure of Beukes et al (6,085,659). Beukes discloses a detonator 10 which comprises a tubular housing 24 open at one end, a circuit board 34 supporting electronics components 36, 38. One end of the circuit board 34 is supported at an intermediate portion of the housing by means of a header 32. The header 32 also supports one end of an initiating device 12 in the form of an integrated circuit. The other

end of the initiating device 12 resides within a primary explosive material 30. As best understood, Beukes is cited for its' teaching of using a header 32 to support the circuit board 34 and the initiating device 12. It is to be noted that the circuit board 34 and initiating device 12 are each supported only at an end such that these structures are cantilevered from opposed ends of the header 32, and also that the header 32 does not close the end of the tubular housing 24.

With respect to claim 2, the Examiner referred to the disclosure of Duget et al (US 6,418,853). Duget discloses an airbag igniter structure which includes a circuit board 17 disposed within a casing, the circuit board including a communication/ignition circuit. Duget shows a resistive heating element 11 disposed within the casing 2 on an opposed side of a metal partition 8 with respect to the circuit board 17. As best understood, Duget is cited for its teaching of providing a plastic piece 32 and injected thermosetting polymer disposed in the casing and configured to close the open end of the casing and support the ignition package within the casing.

In his remarks, the Examiner noted that claim 1 could avoid rejection in view of Goernig and Beukes by a recitation in which the first and second silicon chips are entirely encased in a single synthetic resin body, with the exception of a portion of the ignition charge. The Examiner considered the invention of claim 2 to still be quite broad in scope.

Based on his remarks, the following second set of proposed amendments were presented to the Examiner for consideration:

> Claim 1 (currently amended). An ignition device for bus connection, of a type in which a plurality of the ignition devices are connected to an ignition control system via a common bus, and the ignition devices are selectively operable by means of electrical energy and an electrical signal supplied from the ignition control system,
>
> wherein the ignition device comprises:
>
> an ignition package integrally comprising a communication/ignition circuit provided

on a first silicon chip and an ignition element provided on ~~another~~ a second silicon chip, wherein

the first and second silicon chip are completely enclosed within and supported by a single synthetic resin body such that the first silicon chip is supported independently of the second silicon chip, and

wherein the synthetic resin body has an opening defined therein, and said ignition element is disposed in said opening in contact with an igniting agent.

Claim 2 (currently amended). An ignition device for bus connection, of a type in which a plurality of the ignition devices are connected to an ignition control system via a common bus, and the ignition devices are selectively operable by means of electrical energy and an electrical signal supplied from the ignition control system,

wherein the ignition device comprises:

an ignition package integrally comprising a communication/ignition circuit provided on a silicon chip and an ignition element also provided on the silicon chip,

a casing which houses the ignition package therein, the casing having side walls extending in a longitudinal direction of the casing, the casing having a closed end and an open end opposed to the closed end, and

a header disposed in the casing, the header configured to close the open end of the casing, the header supporting the ignition package within the casing such that the silicon chip is disposed in a plane transverse to the longitudinal direction of the casing.

After consideration of the second set of proposed claim amendments, the Examiner indicated that the current form of claim 1 would receive favorable consideration.

However, the Examiner noted that claim 2, although distinguished from Goernig as modified by Duguet, would not avoid an obviousness-type rejections in view of Duguet as modified by a newly cited prior art reference Adams et al (US 6,166,452). The Examiner noted that Adams et al. presents a chip disposed in a plane transverse to the longitudinal direction of the casing, and suggested further amending claim 2 to clearly claim both a header and the resin epoxy surrounding the circuit board, in which the circuit board is supported by the resin epoxy.

Consequently, no agreement was reached.

Information Disclosure Statement

At item 2 of the Office Action, the Examiner stated that in the IDS dated 12/30/2003, the document number 4,847,309 was entered in error and thus was not considered. In response, the applicant has filed an IDS on July 18, 2008 for consideration by the Examiner which includes the correct document number, 5,847,309.

Claim Objections

At item 3 of the Office Action, the Examiner objected to claims 9 and 10 because of informalities. In particular, the Examiner noted that these claims included the following problematic phrase "wherein the ignition said communication/ignition circuit". The applicant has amended claims 9 and 10 herein to correct these informalities by deleting the phrase "the ignition", whereby the objection is obviated.

Claim Rejections – 35 USC 103

At item 6 of the Office Action, **the Examiner rejected claims 1-12 under 35 USC 103(a) as being unpatentable over Goernig et al. (US 2002/0166472) in view of Davis et al. (US 5,760,489)**. In the rejection of claims 1 and 2, the Examiner states that Goernig et al. teach an ignition device comprising an ignition package (4 & 5) integrally comprising a communication/ignition circuit 6 provided on a chip 2, which is constructed of a thermally insulating material (para. 23), and that the igniter 11 contains an ignition element 1 provided on the chip. The Examiner states that Goernig further teaches that the ignition device comprises a bus connection (para. 32), and that the ignition element is provided on another chip than the ignition package (para.

33), but that Goernig fails to teach that the bus connection is of a type in which a plurality of the ignition devices are connected to an ignition control system via a common bus, and the ignition devices are selectively operable by means of electrical energy and an electrical signal supplied from the ignition control system, that the chip is a silicon chip.

The Examiner further states that Davis et al., in Figs. 1 and 2, teaches an ignition device comprising a bus connection, of a type in which a plurality of ignition devices (20A-N) are connected to an ignition control system 11 and 12 via a common bus 14 and 16, and the ignition devices are selectively operable by means of electrical energy and an electrical signal supplied from the ignition control system (col. 2, lines 9-36). The Examiner contends that it would be obvious to combine the teachings of Goernig with Davis by connecting a plurality of ignition devices taught by Goernig to the bus connection of Davis for the purpose of providing mechanical shock protection to a multiple airbag system. The Examiner considers use of silicon as a chip material to be within the general skill of a worker in the art.

Applicant's Response

Upon review of Goernig, the applicant finds that a circuit board 2 is disclosed which supports an ignition electronics assembly 6 (corresponding to the claimed communication/ignition circuit) configured as a first chip on the circuit board, as well as an igniter element 10 (corresponding to the claimed ignition element) configured as a second chip on the circuit board 2. A pyrotechnic charge 3 is disposed adjacent to an edge of the circuit board, adjacent to the igniter element. A space is provided between the igniter element 10 and the ignition electronics assembly 6, which is filled with a deformable, relatively soft plastic pressure absorbing material. The circuit board 2 is also provided with perforations 24 which permit the igniting portion of the circuit board to

separate from the electronics portion of the circuit board during an ignition event.

Davis et al., as discussed by the applicant in the Background section of the specification, discloses an arrangement in which a plurality of remote modules including airbag devices are connected to a common bus extending from an ignition control system, electrical energy is supplied from the ignition control system to an ignition device (squib) of each of the airbag devices, and an electrical signal is also supplied for operating only the ignition device of a predetermined airbag device among a plurality of airbag devices. Thus Davis teaches centralized control of each of the plural remote modules (col. 3, lines 13-32).

As discussed above with respect to the initial telephone interview, the applicant respectfully disagrees with the Examiner's rejection of claim 1 because his interpretation of the references is not consistent with the actual disclosures thereof. For example, that the Examiner refers to Goernig's circuit board 2 as a chip, and states that the communication/ignition circuit 6 is provided on the chip 2, and that the igniter 11 is also provided on the chip. According to the Examiner's stated interpretation of the disclosure of Goernig, both the communication/ignition circuit 6 and the igniter 11are provided on the chip 2. This configuration is inconsistent with the recited feature of claim 1 in which the ignition element is provided on another silicon chip than that on which the communication/ignition circuit is mounted.

In addition, the applicant disagrees with the rejection of claim 1 since the applicant does not agree with the Examiner's characterization of the circuit board 2 as a chip. The circuit carrier 2 is clearly disclosed by Goernig to be a circuit board (para. 22 and 30), and the ignition electronics assembly 6 and the igniter element 10 each comprise an individual chip, each of which is mounted on the circuit board 2 (para. 22), Fig. 1. This interpretation is substantiated at

para. 12, 22, 24 and 25, which discuss how the carrier body 11 of the igniter element 10 is designed to conform with other electronic components, such as the ignition electronics assembly 6, for ease of handling, processing and mounting on the carrier 2, and which discuss how the carrier body conforms with standard SMD structure. This interpretation is further substantiated in the discussion of the electronic assembly 6 at para. 32.

As regards the rejection of claim 2, the applicant respectfully does not agree with the Examiner's interpretation of the Goernig reference, as discussed above. In particular, the applicant does not agree that the ignition device disclosed by Goernig provides an ignition element provided on the same silicon chip as the communication/ignition circuit. Instead, Goernig discloses the igniter element 10 in the form of a first chip, and the ignition electronics assembly 6 in the form of a second chip, both of which are mounted on, and interconnected through, the circuit board 2. Thus, Goernig/Davis do not make obvious the claimed recitation in which a communication/ignition circuit is provided on a silicon chip, and the ignition element is provided on the (same) chip. As discussed by the applicant, providing both the communication/ignition circuit and the ignition element on a single chip is very beneficial since it reduces the overall size of the ignition device, reduces manufacturing costs, and reduces assembly steps.

However, based on the foregoing and on the telephone interviews discussed above, claims 1 and 2 are amended herein. Claims 1 and 2, as amended herein, are considered to avoid rejection under 35 USC 103(a) as obvious in view of Goernig in view of Davis et al (US 5,760,489). In addition, claim 1 is considered to avoid Beukes et al (US 6,085,659) (fig. 2), and claim 2 is considered to avoid Duguet et al. (US 6,418,853) (Fig. 1).

As regards claim 1, claim 1 is amended herein to recite that the first and second silicon chip

are completely enclosed within and supported by a single synthetic resin body such that the first silicon chip is supported independently of the second silicon chip, and that the synthetic resin body has an opening defined therein, and said ignition element is disposed in said opening in contact with an igniting agent. This structure is shown in applicant's Fig. 4.

This structure is quite different from that of Goernig since Goernig discloses first (6) and second (10) chips supported on a single supportive body (circuit board 2). Moreover, although Goernig discloses enclosing the igniter element 10 and circuit carrier 2 in an elastic encasing material 4 (para. 27), and further discloses encasing the ignition electronic assembly 6 within a relatively hard encasing material 5(para. 28), Goernig does not disclose or suggest independently supporting two individual chips within a single resin body, as presented in proposed claim 1.

In addition, claim 1, as modified herein, avoids rejection as obvious in view of Goernig as modified by Beukes et al (US 6,085,659). Beukes discloses a detonator 10 which comprises a tubular housing 24 open at one end, a circuit board 34 supporting electronics components 36, 38. One end of the circuit board 34 is supported at an intermediate portion of the housing by means of a header 32. The header 32 also supports one end of an initiating device 12 in the form of an integrated circuit. The other end of the initiating device 12 resides within a primary explosive material 30. As best understood, Beukes is cited for its' teaching of using a header 32 to support the circuit board 34 and the initiating device 12. It is to be noted that the circuit board 34 and initiating device 12 are each supported only at an end such that these structures are cantilevered from opposed ends of the header 32, and also that the header 32 does not close the end of the tubular housing 24.

The applicant disagrees that Goernig as modified by the teaching of Buckes makes obvious the invention claimed herein since although Buckes shows a single header supporting both a circuit

board and an initiating device, the circuit board and the initiating device are not completely enclosed therein , as claimed. Moreover, neither Goernig nor Beukes disclose the header comprising an opening formed therein to permit the ignition element to come into contact with the igniting agent as claimed.

Based on the Examiner's comments as provided in the telephone interview, claim 1 as amended herein, is considered to avoid rejection in view of the cited prior art based in the claimed features in which the first silicon chip and second silicon chip are embedded in a single resin body, and in which the first silicon chip is supported independently of the second silicon chip by the synthetic resin.

As regards claim 2, claim 2 is amended herein to recite that wherein the ignition device comprises an ignition package integrally comprising a communication/ignition circuit provided on a silicon chip and an ignition element also provided on the silicon chip, a casing which houses the ignition package therein, the casing having a single open end, and a header disposed in the casing, the header configured to close the open end of the casing, the header supporting the ignition package within the casing. Claim 2 is further amended to recite that the components of the ignition package are enclosed within the synthetic resin body, and the synthetic resin body is supported by the header.

This structure is quite distinct from that disclosed by Goernig, since Goernig does not disclose a casing having a single open end, but rather discloses a housing canister 7A including a housing lid or cap 7B (para. 22, Fig. 1). Moreover, Goernig fails to disclose a header disposed in the open end and configured to close the open end, the header also supporting the ignition package within the casing. Although the cap 7B could be broadly interpreted to comprise a

header which closes the open end, the cap 7B of Goernig does not support the ignition package within the canister.

In addition, claim 2 as amended herein avoid rejection in view of Goernig as modified by Duget et al (US 6,418,853). Duget discloses an airbag igniter structure which includes a circuit board 17 disposed within a casing, the circuit board including a communication/ignition circuit. Duget shows a resistive heating element 11 disposed within the casing 2 on an opposed side of a metal partition 8 with respect to the circuit board 17. As best understood, Duget is cited for its teaching of providing a plastic piece 32 and injected thermosetting polymer disposed in the casing and configured to close the open end of the casing and support the ignition package within the casing.

The plastic piece 32 and thermoplastic polymer of Duguet do not correspond to the header as claimed, since the circuit board 17 and resistive heating element 11 are supported by the metal disc 8 rather than by the plastic piece 32, since the plastic piece 32 is assembled to the case 2 at a later step than the circuit board 17, and then a filler (thermoplastic polymer) is injected into the structure in order to fill in any gaps between the circuit board 17and plastic piece 32 (col. 4, lines 29-33).

Claim 2 as amended herein recites the structure in which the components of the ignition package are enclosed within the synthetic resin body, and the synthetic resin body is supported by the header. These features are not suggested or disclosed by Adams et al (US 6,166,452), who disclose an airbag igniter 10 in which the electronic circuits are disposed on a first side of a circuit board 25 so as to be disposed within in a chamber 43 corresponding to a metal disk 26 on one side, the circuit board 25 on the other, and a metal ring 36 forming a peripheral sidewall (col. 3, lines 37-

48). Adams further discloses filling the chamber 43 with epoxy to provide support for the ceramic circuit board (col. 6, lines 10-20). However, the heating member (corresponding to the claimed ignition element) is disposed outside the chamber 43, on a side of the circuit board opposed to the electronic circuits. Thus, the disclosure of Duguet, which shows a similar configuration in which the heating element 11 is disposed on an opposed side of a barrier 8 relative to the circuit board 17, as modified by Adams et al does not make obvious the applicant's invention. Moreover, Goernig does not disclose a header, other than housing lid or cap 7B, and the cap 7B does not support any of the plural resin bodies 4, 5 of Goernig.

For these reasons, claim 2 avoids rejection as obvious in view of the prior art, and reconsideration and withdrawal of the rejection thereof is respectfully requested.

At item 9 of the Office Action, in the rejection of claims 3 and 4, the Examiner states that Goernig in view of Davis discloses the ignition device for the bus connection of claim 1, and Goernig further discloses the ignition package 4, 5 is used as a header of the ignition device.

Applicant's Response

The applicant respectfully disagrees with the rejection of claims 3 and 4 for the reasons stated above with respect to claims 1 and 2, respectively, from which they depend.

Moreover, the applicant disagrees that Goernig expressly discloses the ignition package (as represented by 4 and 5) is used as a header. Goernig discloses a lid/cap 7B which closes an end of a housing canister 7A. The applicant submits that the lid/cap 7B of Goernig corresponds to the claimed header, which is described in the applicant's specification as blocking the opening 21b of the casing 21. Thus, the elements 4 and 5 of Goernig, as asserted by the Examiner to represent the

ignition package, do not act as a header for the ignition device, as claimed.

At item 10 of the Office Action, in the rejection of claim 5, the Examiner states that Goernig in view of Davis discloses the ignition device for the bus connection of claim 1, and Goernig further discloses the ignition element 1 is disposed on an outer surface of the ignition package (4, 5) in contact with an igniting agent.

Applicant's Response

The applicant respectfully disagrees with the rejection of claim 5 for the reasons stated above with respect to claim 1, from which claim 5 depends.

At item 11 of the Office Action, in the rejection of claim 6, the Examiner states that Goernig in view of Davis discloses the ignition device for the bus connection of claim 1, and Goernig further discloses, in Figs. 4 and 5, that the ignition package 4 and 7C has an opening defined therein, and said ignition element is disposed in the opening in contact with the igniting agent.

Applicant's Response

The applicant respectfully disagrees with the rejection of claim 6 for the reasons stated above with respect to claim 2, from which it depends.

At item 13 of the Office Action, in the rejection of claim 9, the Examiner states that Goernig in view of Davis discloses the ignition device for the bus connection of claim 1, and Goernig further discloses that the communication/ignition circuit 6 and ignition element 1 are electrically connected within the ignition package via a soldered connection (para. 33).

Applicant's Response

The applicant respectfully disagrees with the rejection of claim 9 for the reasons stated above with respect to claim 1, from which it depends.

At item 14 of the Office Action, in the rejection of claim 10, the Examiner states that Goernig in view of Davis discloses the ignition device for the bus connection of claim 2, and Goernig further discloses that the communication/ignition circuit 6 and ignition element 1 are electrically connected within the ignition package via traces 22.

Applicant's Response

The applicant respectfully disagrees with the rejection of claim 10 for the reasons stated above with respect to claim 2, from which it depends. In addition, while it appears that Goernig discloses an electrical connection between the communication/ignition circuit 6 and ignition element 1 through the circuit board 2, which "has suitable metal layers deposited thereon to form conductor path structures…in the manner of any known circuit board." (para. 30), the applicant respectfully disagrees with this rejection since there is no disclosure of "traces 22" as presented by the Examiner to correspond to the element which provides the claimed electrical connection.

At item 15 of the Office Action, in the rejection of claims 11 and 12, the Examiner states that Goernig in view of Davis discloses the ignition device for the bus connection of claims 1 and 2, and Goernig further discloses pins 8 being electrically connected to a communication/ignition circuit, and that the pins are connected to a common bus (para. 32, lines 1-4).

Applicant's Response

The applicant respectfully disagrees with the rejection of claims 11 and 12 for the reasons stated above with respect to claims 1 and 2, respectively, from which they depend.

Conclusion

Applicant respectfully submits that all of the above amendments are fully supported by the original application. Applicant also respectfully submits that the above amendments do not introduce any new matter into the application.

Based on all of the foregoing, applicant respectfully submits that all of the objections and rejections set forth in the Office Action are overcome, and that as presently amended, all of the pending claims are believed to be allowable over all of the references of record, whether considered singly or in combination. Applicant requests reconsideration and withdrawal of the rejection of record, and allowance of the pending claims.

If any issues remain unresolved, applicant respectfully requests that the Examiner telephonically contact applicant's undersigned representative to expeditiously resolve prosecution of the application.

Favorable consideration is respectfully requested.

Respectfully submitted,

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